

## **SEMI-YEARLY REPORT**

(for July-December 1998)

Contract No. NAS596060

Enhanced Land cover and Land Cover Change products from  
MODIS Algorithm Development and Post Launch Studies

by

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### **1. At-launch Land Cover Product.**

#### **a. Task Objectives:**

The principal objective of this task is to supply a validated at-launch land cover product based on the AVHRR at a resolution of 1 km.

#### **b. Task Progress:**

We successfully generated a 1 km land cover product to be included with EDC's DISCover product as the MODIS at-launch product.

This product will conform to MOD12 file specifications as much as possible and will contain both the UMD and EDC land cover products. It is tiled and gridded in the integerized sinusoidal projection and possibly the Goode's Homolosine projection as well.

A final version of the UMD 1km land cover map was completed in March 1998. The meta-data describing the quality of both the EDC 1 km product and our own have been prepared. Validation of our land cover product is being carried out.

A final version of the coding for the output of the 1km land cover product has been delivered to SDST for use as simulated data.

A paper describing the UMD 1km land cover classification has been submitted and in review for a special issue of the

International Journal of Remote Sensing (Hansen, DeFries, Townshend, Sohlberg, Global Land Cover Classification at 1km Spatial Resolution Using A Supervised Decision Tree Approach - IJRS special Issue).

In response to NASA headquarters' request, we have generated a global tree cover poster describing the percent coverage of forest, needleleaf vs broadleaf forest and evergreen vs coniferous forest within each 1km pixel of the world. The poster has been delivered to several federal government agents and the White House.

c. Anticipated Activities During the Next Semi-year:

Version 3.0 of the 1km land cover classification product will be generated with distinction between small grain crops and broadleaf crops and several questions addressed. This distinction is needed by several members of the MODIS science team for creatign their own products.

## **2. Land cover change indicator product.**

a) Task objectives

- i) Generation of test data sets.
- ii) Production and testing of the at-launch change detection algorithm.
- iii) Production and testing of post-launch change detection algorithm.

b) Task progress

- i) Another 10 pairs of Landsat Thematic Mapper images were selected and purchased for simulating MODIS data to test the land cover change detection algorithms.
- ii) Tow papers describing the land cover change detection algorithms were presented to IGARSS'98 in Seattle (Paper 1: Zhan, Huang, Townshend, Defries, Hansen, Dimiceli, Sohlberg, Hewson-Scardelletti and Tompkins, Land Cover Change Detection with Change Vector in the Red and Near Infrared Reflectance Space - IGARSS'98 Digest, pp.859-861. Paper 2: Hansen, DeFries, Dimiceli, Huang, Sohlberg, Zhan, Townshend, Red and Infrared Space Partitioning for Detecting Land Cover Change - IGARSS'98 Digest, pp. 2512-2514).

Another paper related to change detection algorithms (Huang, C., Townshend, J.R.G., Zhan, X., Hansen, M., DeFries, R. and Sohlberg, R. 1998. Developing the spectral trajectories of major land cover change processes. Proceedings of SPIE, Vol. 3502) was presented to SPIE in Beijing September 1998.

A paper describing the generation and the algorithms of the land cover change product is submitted and in review for a special issue of the International Journal of Remote Sensing (Zhan, Defries, Townshend, Hansen, Huang, Sohlberg, The 250m Global Land Cover Change Product from the Moderate Resolution Imaging Spectroradiometer of NASA's Earth Observing System. -IJRS special issue).

iii) After the LUTs required by the 5 change detection algorithms have been completed with AVHRR data using the pilot automation procedures and delivered to SDST, no major actions have been carried out for the post-launch product in this semi-year.

c) Anticipated Activities during the Next Semi-year

i) The more test data set will be created for testing changes of more different landcover types with the purchased 10 pairs of Landsat TM images.

ii) Refinements of the LUT generation procedures are anticipated. The texture change detection LUTs will be modified with more detailed thresholds. More testing of the LUTs against the test data sets will be carried on.

iii) Automation code for generating the LUTs will be examined and refined. Evaluation of the Look-Up Tables of the change detection algorithms will be continued for the refinement of the post-launch MODIS product.

### **3. Continuous fields of land cover properties**

a) Task objectives

Generation of continuous fields of land cover attributes

b) Task progress

The computer code for the MODIS Vegetation Continuous Fields post-launch product is already written and in the debugging stage.

In response to NASA headquarters' request and using a combination of the continuous fields algorithm and the 1km land cover classification algorithm, we have generated a global tree cover poster describing the percent coverage of forest, needleleaf vs broadleaf forest and evergreen vs coniferous forest within each 1km pixel of the world. The poster has been delivered to several federal government agents and the White House.

A paper describing the global vegetation continuous fields (DeFries, R.S., Hansen, M., Townshend, J. in press, Continuous Fields of Vegetation Characteristics at the Global Scale, Journal of Geophysical Research) is in press of publication.

A paper about using multiyear AVHRR data for global scale continuous fields of vegetation characteristics has been accepted for publication in the International Journal of Remote Sensing (DeFries, Townshend, Hansen, Continuous Fields of Vegetation Characteristic from global, multiyear AVHRR data - IJRS).

#### c) Anticipated Activities during the Next Semi-year

We plan to assess the accuracy of the prototype AVHRR products for continuous fields based on comparisons with other global and regional land cover products. In addition, we plan to develop code for deriving continuous fields from MODIS data as a post-launch product.

The computer code for the MODIS Vegetation Continuous Fields post-launch product will be delivered.